6560-50-P

ENVIRONMENTAL PROTECTION AGENCY

[FRL-10016-84-OAR]

Official Release of the MOVES3 Motor Vehicle Emissions Model for SIPs and Transportation Conformity.

AGENCY: Environmental Protection Agency (EPA).

ACTION: Notice of availability.

SUMMARY: The Environmental Protection Agency (EPA) is announcing the availability of the MOtor Vehicle Emission Simulator model (MOVES3) for official purposes outside of California. MOVES3 is the latest state-of-the art upgrade to EPA's modeling tools for estimating emissions from cars, trucks, buses, and motorcycles based on the latest data and regulations. MOVES3 is available for use in state implementation plans (SIPs) and transportation conformity analyses outside of California. This notice starts a two-year grace period before MOVES3 will need to be used as the latest EPA emissions model in new regional emissions analyses and a two-year grace period before MOVES3 will need to be used in new hot-spot analyses for transportation conformity determinations outside of California.

DATES: EPA's announcement of the MOVES3 emissions model for SIPs and transportation conformity analyses in states other than California is effective **[INSERT DATE OF PUBLICATION IN FEDERAL REGISTER].** This announcement starts a two-year transportation conformity grace period that ends on January 9, 2023. After this date, MOVES3 will need to be used as the latest EPA emissions model in both regional emissions analyses and in hot-spot analysis for new transportation conformity analyses outside of California.

FOR FURTHER INFORMATION CONTACT: For technical model questions regarding the official release or use of MOVES3, please email EPA at mobile@epa.gov.

For questions about SIPs, contact Rudy Kapichak at Kapichak.Rudolph@epa.gov, 734-214-4574. For transportation conformity questions, contact Astrid Terry at Terry.Astrid@epa.gov, 734-214-4812.

SUPPLEMENTARY INFORMATION:

The contents of this notice are as follows:

I. General Information

A. Does this Action Apply to Me?

Entities potentially impacted by the approval of MOVES3 are those that adopt, approve, or fund transportation plans, transportation improvement programs (TIPs), or projects under title 23 U.S.C. or title 49 U.S.C. Chapter 53 and those that develop and submit SIPs to EPA. Regulated categories and entities affected by today's action include:

Category	Examples of regulated entities
Local government	Local air quality and transportation agencies, including metropolitan planning organizations (MPOs).
State government	State air quality and transportation agencies.
Federal government	Department of Transportation (Federal Highway Administration (FHWA) and Federal Transit Administration (FTA)).

This table is not intended to be exhaustive, but rather provides a guide for readers regarding entities likely to be affected by the release of MOVES. Other entities not listed in the table could also be affected. To determine whether your organization is affected by this action, you should carefully examine the transportation conformity applicability requirements in 40 CFR 93.102. If you have questions regarding the applicability of this action to a particular entity, consult the persons listed in the preceding **FOR FURTHER INFORMATION CONTACT** section.

B. How Can I Get Copies of MOVES3 and Other Related Information?

The official version of the MOVES3 model, along with user guides and supporting documentation, are available on EPA's MOVES website: www.epa.gov/moves. Individuals who wish to receive EPA announcements related to the MOVES3 model should subscribe to the EPA-MOBILENEWS e-mail listserv, which can be done at EPA's website at: www.epa.gov/moves/forms/epa-mobilenews-listserv.

Available guidance on how to apply MOVES3 for SIPs and transportation conformity purposes can be found on EPA's transportation conformity website, www.epa.gov/state-and-local-transportation/policy-and-technical-guidance-state-and-

local-transportation,[1] including "Policy Guidance on the Use of MOVES3 for State Implementation Plan Development, Transportation Conformity, General Conformity, and Other Purposes" (EPA-420-B-20-044, November 2020).[2]

EPA will continue to update these websites as other MOVES support materials and guidance are developed or updated.

II. What is MOVES3?

MOVES3 is EPA's latest motor vehicle emissions model for state and local agencies to estimate volatile organic compounds (VOCs), nitrogen oxides (NOx), particulate matter ($PM_{2.5}$ and PM_{10}), carbon monoxide (CO), and other precursors from cars, trucks, buses, and motorcycles for SIP purposes and conformity determinations outside of California.[3] The model is based on analyses of millions of emission test results and considerable advances in the Agency's understanding of vehicle emissions.

The first model in the MOVES series, called MOVES2010, was released in December of 2009. MOVES2010 was followed by two minor updates, MOVES2010a and MOVES2010b. Both of these minor MOVES2010 revisions enhanced model performance. MOVES2014, released in 2014, was a major revision to MOVES2010b and included new data, new emissions standards, and new functional improvements and features. It incorporated substantial new data for emissions, fleet, and activity developed since the release of MOVES2010. MOVES2014 was also followed by two minor updates, MOVES2014a and MOVES2014b.[4]

---

[1] Interested parties can find these documents under either the "Emission Models and Conformity" or "Project-Level Conformity" topics on this website.
[2] This guidance, along with the other EPA guidance referenced in this document, is listed in the EPA guidance portal at www.epa.gov/guidance/guidance-documents-managed-office-air-and-radiation.
[3] MOVES can also model emissions in the District of Columbia, Puerto Rico, and the U.S. Virgin Islands. Nonattainment and maintenance areas located in California use the latest approved version of the Emission FACtor (EMFAC) model.
[4] In the remainder of this notice, "MOVES2014" refers to all of the MOVES2014 models: MOVES2014, MOVES2014a, and MOVES2014b.

MOVES3 incorporates new regulations, features and significant new data, as detailed in the MOVES3 technical reports. Notably, MOVES3 incorporates:

- Improvements to heavy-duty (HD) diesel running emission rates based on manufacturer in-use testing data from hundreds of HD trucks;
- Updated emission rates for HD gasoline and compressed natural gas (CNG) trucks;
- Updated light-duty (LD) vehicle emission rates for hydrocarbons (HC), CO and NOx-based on in-use testing data;
- Updated LD PM rates for Model Year (MY) 2004 and later, incorporating data on gasoline direct injection engines;
- New fuel characteristic data from EPA fuel compliance submissions;
- Updated fuel effect calculations to better characterize the base fuel used to develop LD base emission rates;
- The effects of the HD Phase 2 GHG rule;[5]
- The effects of the Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule on light-duty fuel economy;[6]
- "Off-network idle" emissions beyond the idling that is already considered in the MOVES drive cycles; and
- Several improvements to the MOVES interface, user inputs and outputs.

MOVES3 also includes a variety of activity updates, most notably:

- Vehicle start and idling activity patterns are based on real-world instrumented vehicle data collected by a telecommunications company for LD vehicles and the Department of Energy's (DOE) National Renewable Energy Lab (NREL) for HD vehicles;
- Default hotelling activity has been substantially reduced from what was included in MOVES2014 based on the NREL instrumented truck data;
- National vehicle miles travelled (VMT) and vehicle population inputs have been updated with newer historical data from the Federal Highway Administration (FHWA) and more recent forecasts from DOE; and
- National onroad vehicle default fuel, regulatory class, and age distributions are based on newer vehicle registration data.

MOVES3 includes the capability to estimate vehicle exhaust and evaporative emissions as well as brake wear and tire wear emissions for criteria pollutants and precursors. However, MOVES3 does not include the capability to estimate emissions of

[5] 81 FR 7348, October 25, 2016.
[6] 85 FR 24174, April 30, 2020.

re-entrained road dust. To estimate emissions from re-entrained road dust, practitioners should continue to use the latest approved methodologies.[7]

The structure of MOVES3 is fundamentally the same as MOVES2014, although there are new format options for some inputs, and the model run time may differ depending on the type of run and user inputs and computer configuration. As for emissions, EPA performed a comparison of MOVES3 to MOVES2014b using default information in MOVES3 at the national level, and for two sample urban counties with different local travel patterns and ambient conditions. In general, compared to MOVES2014b, MOVES3 national emission estimates are slightly lower for most criteria pollutants in future years. However, in the two sample urban counties, NOx emissions estimates were higher in future years. This is due to higher running emissions from heavy-duty trucks outweighing declines from heavy-duty hotelling. Note that results will vary based on the pollutant selected and that area's local inputs. Based on our testing, MOVES run time at the Default and County Scale should be about the same or faster than runs with MOVES2014b. In addition, MOVES3 run time at the Project Scale may be notably longer compared to MOVES2014 depending on the type of run, user inputs and computer configuration.

III. SIPs and MOVES3

EPA has articulated its policy regarding the use of MOVES3 in SIP development in its "Policy Guidance on the Use of MOVES3 for State Implementation Plan Development, Transportation Conformity, General Conformity and Other Purposes" (EPA-420-B-20-044, November 2020). Today's notice highlights certain aspects of the guidance, but state and local governments should refer to the guidance for more detailed

---

[7] See EPA's notice of availability, "Official Release of the January 2011 AP-42 Method for Estimating Re-Entrained Road Dust from Paved Roads," published in the *Federal Register* on February 4, 2011 (76 FR 6328).

information on how and when to use MOVES3 in reasonable further progress SIPs, attainment demonstrations, maintenance plans, inventory updates, and other SIP submissions.

MOVES3 should be used in ozone, CO, PM, and nitrogen dioxide (NO_2) SIP development as expeditiously as possible, as there is no grace period for the use of MOVES3 in SIPs. The Clean Air Act requires that SIP inventories and control measures be based on the most current information and applicable models that are available when a SIP is developed.[8] However, EPA also recognizes the time and level of effort that certain states may have already undertaken in SIP development using a version of MOVES2014. States should consult with their EPA Regional Office if they have questions about how MOVES3 affects SIPs under development in specific nonattainment or maintenance areas. Early consultation can facilitate EPA's adequacy finding for SIP motor vehicle emissions budgets for transportation conformity purposes or EPA's SIP approval.

States should use the latest version of MOVES that is available at the time that a SIP is developed. All states other than California should use MOVES3 for SIPs that will be submitted in the future so that they are based on the most accurate estimates of emissions possible. However, state and local agencies that have already completed significant work on a SIP with a version of MOVES2014 (e.g., attainment modeling has already been completed with MOVES2014) may continue to rely on the earlier version of MOVES. It would be unreasonable to require the states to revise these SIPs with MOVES3 since significant work has already occurred based on the latest information available at the time the SIP was developed, and EPA intends to act on these SIPs in a timely manner.

---

[8] See Clean Air Act section 172(c)(3). Also see the discussion of emissions inventory requirements in the "Fine Particulate Matter National Ambient Air Quality Standards: State Implementation Plan Requirements" rule (81 FR 58029, August 24, 2016) and in the "Implementation of the 2015 National Ambient Air Quality Standards for Ozone: Nonattainment Area State Implementation Plan Requirements" rule (83 FR 63022, December 6, 2018).

The Clean Air Act does not require states that have already submitted SIPs or will submit SIPs shortly after the release of a new model to revise these SIPs simply because a new motor vehicle emissions model is now available.[9] States can choose to use MOVES3 in these SIPs, for example, if it is determined that it is appropriate to update motor vehicle emissions budgets ("budgets") with the model for future conformity determinations. However, as stated above, states should use MOVES3 where SIP development is in its initial stages or has not progressed far enough along that switching from a previous model version would create a significant adverse impact on state resources.

Incorporating MOVES3 into the SIP now could assist areas in mitigating possible transportation conformity difficulties in the future after the MOVES3 conformity grace period ends. New regional emissions analyses using EPA's emissions model that are started after the grace period is over must be based on MOVES3 (40 CFR 93.111), so having MOVES3-based SIP budgets in place at that time could provide more consistency with transportation conformity determinations.

IV. Transportation Conformity and MOVES3

In today's notice, EPA is announcing the availability of MOVES3 for use in transportation conformity analyses outside of California. EPA is also establishing a two-year grace period before MOVES3 will need to be used in regional emissions analysis for transportation conformity determinations and in hot-spot analyses for project-level transportation conformity determinations which use EPA's emissions model. The MOVES3 grace period for regional emissions and hot-spot analyses applies to the use of MOVES3 and any future minor revisions that occur during the grace period.

---

[9] Sierra Club v. EPA, 356 F.3d. 296, 308 (D.C. Cir. 2004) ("To require states to revise completed plans every time a new model is announced would lead to significant costs and potentially endless delays in the approval processes.")

Transportation conformity is a Clean Air Act requirement to ensure that federally supported highway and transit activities are consistent with ("conform to") the SIP. Conformity to a SIP means that a transportation activity will not cause or contribute to new air quality violations; worsen existing violations; or delay timely attainment of national ambient air quality standards or any interim milestones. Transportation conformity applies in nonattainment and maintenance areas for transportation-related pollutants: ozone, CO, $PM_{2.5}$, PM_{10} and NO_2. EPA's transportation conformity regulations (40 CFR Parts 51.390 and 93 Subpart A) describe how federally funded and approved highway and transit projects meet these statutory requirements.

The remainder of this section describes how the transportation conformity grace period was determined and summarizes how it will be implemented, including those circumstances when the grace period could be shorter than two years for regional emissions analyses. However, for complete explanations of how MOVES3 is to be implemented for transportation conformity, including details about using MOVES3 during the grace period, refer to "Policy Guidance on the Use of MOVES3 for State Implementation Plan Development, Transportation Conformity, General Conformity and Other Purposes" (EPA-420-B-20-044).

A. Why is EPA Establishing a Two-Year Conformity Grace Period?

Section 176(c)(1) of the Clean Air Act states that "…[t]he determination of conformity shall be based on the most recent estimates of emissions, and such estimates shall be determined from the most recent population, employment, travel, and congestion estimates…". Additionally, the transportation conformity rule (40 CFR 93.111) requires conformity analyses to be based on "the latest emissions estimation model available," and further states that this requirement is satisfied if the most current version of EPA's motor vehicle emissions model is used. When EPA announces a new emissions model, such as MOVES3, we establish a grace period before the model needs to be used for

transportation conformity purposes (40 CFR 93.111(b)). In consultation with DOT, EPA must consider the degree of change in the emissions model and the effects of the new model on the transportation planning process (40 CFR 93.111(b)(2)). The transportation conformity rule provides that EPA will establish a grace period for new emissions models of between three and 24 months (40 CFR 93.111(b)(1)).

EPA articulated its intentions for establishing the length of a conformity grace period in the preamble to the 1993 transportation conformity rule (November 24, 1993; 58 FR 62211):

"EPA and DOT [the Department of Transportation] will consider extending the grace period if the effects of the new emissions model are so significant that previous SIP demonstrations of what emission levels are consistent with attainment would be substantially affected. In such cases, States should have an opportunity to revise their SIPs before MPOs must use the model's new emissions factors."

In consultation with DOT, EPA considered the degree of change in MOVES3 and the effects of the new model on the transportation planning process (40 CFR 93.111(b)(2)). EPA considered the time it will take state and local transportation and air quality agencies to conduct and provide technical support for analyses. State and local agencies will need to become familiar with the MOVES3 emissions model and may need to convert existing data for use in MOVES3. Since 1993, the fundamental purpose of section 93.111(b) of the transportation conformity rule has been to provide a sufficient amount of time for MPOs and other state and local agencies to learn and employ new emissions models. The transition to a new emissions model for conformity involves more than learning to use the new model and preparing input data and model output. After model start-up is complete, state and local agencies also need to consider how the model affects regional emissions analysis results and whether SIP and/or transportation plan/TIP changes are necessary to assure future conformity determinations.

The two-year conformity grace period also provides sufficient time for state and local agencies to learn and apply new technical guidance and training courses that reflect MOVES3. EPA is working to update guidance documents and training courses as quickly as possible. EPA will notify MOVES3 users when these important materials are available. Training courses are anticipated to be provided in the form of webinars and other courses and address different levels of State and local expertise.

In addition, many agencies will be implementing the transition to PM and CO hot-spot analyses with MOVES3 for applicable projects in those nonattainment and maintenance areas, with each analysis potentially involving multiple state and local agencies. States with CO hot-spot protocols that were previously approved into the SIP (40 CFR 93.123(a)(1)) that are based on a previous model will need time to revise them. Additional time is necessary to revise previously approved CO hot-spot protocols, and the SIP revision process and state requirements can vary. Finally, EPA considered the general time and monetary resource constraints in which state and local agencies currently operate. Upon considerations of all these factors, EPA is establishing a two-year grace period, which begins today and ends on January 9, 2023, before MOVES3 needs to be used for new transportation conformity analyses outside of California.

B. Circumstances When Grace Period Will Be Shorter Than Two Years

The grace period for regional emissions analyses will be shorter than two years for a given pollutant if an area revises its SIP and motor vehicle emissions budgets with MOVES3 and such budgets have been found adequate or approved into the SIP prior to the end of the two-year grace period. In this case, the new regional emissions analysis must use MOVES3 if the conformity determination is based on a MOVES3-based budget (40 CFR 93.111).

Areas that are designated nonattainment or maintenance for multiple pollutants

may rely on both MOVES3 and MOVES2014 to determine conformity for different pollutants during the grace period. For example, if an area revises a previously submitted (but not approved) MOVES2014-based PM_{10} SIP with MOVES3 and EPA finds these revised MOVES3 budgets adequate for conformity, such budgets would apply for conformity on the effective date of the **Federal Register** notice announcing EPA's adequacy finding. In this example, if the area is nonattainment for PM_{10} and ozone, the MOVES3 grace period would end for PM_{10} regional emissions analyses once EPA found the new MOVES3-based SIP budgets adequate. However, MOVES2014 could continue to be used for ozone-related regional emissions analyses begun before the end of the MOVES3 grace period.[10] In addition, the length of the grace period for hot-spot analyses would not be affected by an early submission of MOVES3-based budgets. In this example, the two-year grace period for PM_{10} hot-spot analyses would continue to apply even if the grace period is shortened for regional PM_{10} conformity analyses. EPA Regional Offices should be consulted for questions regarding such situations in multi-pollutant areas.

In addition, in most cases, if the state revises previously approved budgets based on an earlier EPA emissions model, the revised MOVES3 budgets could not be used for conformity purposes until EPA approves them, i.e., approves the SIP revision. In general, submitted SIPs cannot supersede approved budgets until the submitted SIP is approved. See 40 CFR 93.118(e)(1).

However, 40 CFR 93.118(e)(1) allows an approved budget to be replaced by an adequate budget if EPA's approval of the initial budgets specifies that the budgets being approved may be replaced in the future by new adequate budgets. This flexibility has

---

[10] In this example, such an area would use MOVES3 to develop a regional emissions analysis for PM_{10} for comparison to the revised MOVES3-based budgets (e.g., PM_{10} budgets). The regional emissions analysis for ozone could be based on MOVES2014 for the VOC and NOx budgets in the ozone SIP for the remainder of the conformity grace period.

been used in limited situations in the past. In such cases, the MOVES3-based budgets would be used for conformity purposes once they have been found adequate, if requested by the state in its SIP submission and specified in EPA's SIP approval. States should consult with their EPA Regional Office to determine if this flexibility applies to their situation.

C. Use of MOVES3 for Regional Emissions Analyses During the Grace Period

During the conformity grace period, areas should use interagency consultation to examine how MOVES3 will impact their future transportation plan and TIP conformity determinations, including regional emissions analyses. Isolated rural areas should also consider how future regional emissions analyses will be affected when the MOVES3 grace period ends. Areas should carefully consider whether the SIP and budgets should be revised with MOVES3 or if transportation plans and TIPs should be revised before the end of the conformity grace period, since doing so may be necessary to ensure conformity in the future.

Finally, the transportation conformity rule provides flexibility for completing conformity determinations based on regional emissions analyses that use MOVES2014 that are started before the end of the grace period. Regional emissions analyses that are started during the grace period can use either MOVES2014 or MOVES3. The interagency consultation process should be used if it is unclear if a MOVES2014-based analysis was begun before the end of the grace period. If there are questions about which model should be used in a conformity determination, the EPA Regional Office can be consulted.

When the grace period ends on January 9, 2023, MOVES3 will become the only EPA motor vehicle emissions model for regional emissions analyses for transportation conformity in states other than California. In general, this means that all new transportation plan and TIP conformity determinations started after the end of the

grace period must be based on MOVES3, even if the SIP is based on MOVES2014 or an older version of the MOVES model.

D. Use of MOVES3 for Project-level Hot-spot Analyses During the Conformity Grace Period

The MOVES3 grace period also applies to the use of MOVES3 for CO, PM_{10} and $PM_{2.5}$ hot-spot analyses. Sections 93.116 and 93.123 of the transportation conformity regulation contain the requirements for when a hot-spot analysis is required for project-level conformity determinations.[11] The transportation conformity rule provides flexibility for analyses that are started before the end of the grace period. A conformity determination for a transportation project may be based on a previous model if the analysis was begun before or during the grace period, and if the final environmental document for the project is issued no more than three years after the issuance of the draft environmental document (40 CFR 93.111(c)). Interagency consultation should be used if it is unclear if a previous analysis was begun before the end of the grace period. For CO, PM_{10} and $PM_{2.5}$ hot-spot analyses that start during the grace period, project sponsors can choose to use MOVES2014 or MOVES3.

EPA encourages sponsors to use the consultation process to determine which option may be most appropriate for a given situation. Any new CO, PM_{10} or $PM_{2.5}$ hot-spot analyses for conformity purposes begun after the end of the grace period must be based on MOVES3. EPA has guidance on how to conduct quantitative $PM_{2.5}$ and PM_{10} hot-spot modeling for transportation conformity purposes, and on how to use MOVES for a CO hot-spot analysis. EPA will be updating these guidance documents with MOVES3; until that time, the MOVES2014-based guidance may still generally be used for

---

[11] In CO nonattainment and maintenance areas, a hot-spot analysis is required for all non-exempt projects, with quantitative hot-spot analyses being required for larger, congested intersections and other projects (40 CFR 93.123(a)(1)). In addition, in $PM_{2.5}$ and PM_{10} nonattainment and maintenance areas, the transportation conformity regulation requires that a quantitative hot-spot analysis be completed for certain projects (see 40 CFR 93.123(b)(1)).

MOVES3. See EPA's "Project-level Conformity" website, www.epa.gov/state-and-local-transportation/project-level-conformity-and-hot-spot-analyses, for the latest information and guidance documents on how to conduct CO, PM_{10} and $PM_{2.5}$ hot-spot modeling for transportation conformity purposes.

Any new, quantitative CO, PM_{10} or $PM_{2.5}$ hot-spot analysis for conformity purposes begun after the end of the grace period using EPA's emissions model must use MOVES3. The interagency consultation process should be used if it is unclear whether these conditions are met. For questions about which model should be used in a project-level conformity determination, consult with your EPA Regional Office.

E. FHWA's CO Categorical Hot-spot Finding

FHWA released the most recent CO categorical hot-spot finding for intersection projects on July 17, 2017, that was based on MOVES2014a.[12] During the MOVES3 grace period, a project sponsor outside of California may continue to rely on the categorical finding for applicable projects that are determined through interagency consultation to be covered by the finding's parameters. Any new CO hot-spot analyses for conformity purposes begun after the end of the MOVES3 grace period may no longer rely on the July 2017 CO categorical hot-spot finding because the finding was based on MOVES2014.

F. CO Hot-spot Protocols that Were Previously Approved into the SIP

Section 93.123(a)(1) of the transportation conformity regulation allows areas to develop alternate procedures for determining localized CO hot-spot analyses, when developed through interagency consultation and approved by the EPA Regional Administrator. Some states have chosen in the past to develop such procedures based on previous EPA emissions models.

---

[12] See www.epa.gov/state-and-local-transportation/project-level-conformity-and-hot-spot-analyses#cohotspot.

During the MOVES3 grace period, areas with previously approved CO hot-spot protocols based on MOVES2014 may continue to rely on these protocols. Once the MOVES3 two-year grace period ends, new CO hot-spot analyses for conformity purposes will need to be based on MOVES3 and thus may no longer rely on a CO hot-spot protocols based on MOVES2014.

Dated: November 24, 2020.

Karl J. Simon,

Director, Transportation and Climate Division, Office of Transportation and Air Quality.

[FR Doc. 2021-00023 Filed: 1/6/2021 8:45 am; Publication Date: 1/7/2021]